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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/A/W.No.08/CSR-09/141g/CEMENT/2016-17 Date: 14.09.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY		**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
*NAME OF THE WORK	:	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
REFERENCE		EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	12.09.2016
PERIOD OF TESTING	:	12.09.2016 to 14.09.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	155 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	460 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

A.E.E.

Note:

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****

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Quality Manager

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Job No.: CTCE/BBMP/A/W.No.08/CSR-09/141g/SAND-Gradation/2016-17 : 14.09.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. Amruthraj,**
#715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.

*** Name of Work** : Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 12.09.2016

Date of Testing : 14.09.2016

Total Wt. of Aggregates in gms **1000**

A&B

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	93.50	90-100	90-100	90-100	95-100
2.36	76.30	60-95	75-100	85-100	95-100
1.18	54.90	30-70	55-90	75-100	90-100
600 Micron	29.10	15-34	35-59	60-79	80-100
300 Micron	13.80	5-20	8-30	12-40	15-50
150 Micron	6.00	0-10	0-10	0-10	0-15

*Information is furnished by the Customer/Representative.

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/A/W.No.08/CSR-09/141g/AGG/GR/2016-17 : 14.09.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

*** Customer**	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*** Agency**	: **Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
*** Name of Work**	: Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 12.09.2016
Date of Testing	: 14.09.2016

Total Wt. of Aggregates in gms= **5000**

AE.B

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	98.10	95-100	85-100
20	33.10	30-70	0-20
10	12.20	10-35	0-5
4.75	3.90	0-5	-

* Information is furnished by the Customer/Representative

Civil-Tech Consultants & Engineers Bangalore

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/A/W.No.08/STEEL/2016-17

14.09.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of the work	:	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Date of Test	:	14.09.2016
Technical Reference	:	IS: 1786-2008

AE-8

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm²	Tensile strength (Ultimate stress) N/mm²	Elongation percent gauge length		
1	12	0.89	515	558	13.20	O.K	O.K

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T-2377

Job No.: CTCE/BBMP/A/W.No.08/CSR-09/141g/CUBE/2016-17 20.09.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*Agency	: **Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
*Name of the work	: Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
*Sample ID	: Drain Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
*Grade of Concrete	: M_{20}
Compressive Strength as on	: 7th day
Sample Received on	: 20.09.2016

Sl.No.	*Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	13.09.2016	20.09.2016	8.367	349.8	15.55
2	13.09.2016	20.09.2016	8.142	326.5	14.51
3	13.09.2016	20.09.2016	8.256	333.2	14.81

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Job No.: CTCE/BBMP/A/W.No.08/WMM/Gradation/2016-17 14.09.2016

GRADATION FOR WMM

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Amruthraj,**
#715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.

Name of Work : Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015

Date of Testing : 14.09.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	55	55	1.1	98.9	95-100
22.4	1745	1800	36.00	64.00	60-80
11.2	960	2760	55.20	44.80	40-60
4.75	325	3085	61.70	38.30	25-40
2.36	715	3800	76.00	24.00	15-30
0.600	580	4380	87.60	12.40	8-22
0.075	465	4845	96.90	3.10	0-5

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Job No.: CTCE/BBMP/A/W.No.08/WMM/AIV/2016-17 14.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of the Work	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	14.09.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	298	297	
4	Aggregate Impact value = percent fines	23.00	22.86	
	100* (W_2/W_1)%			**22.93**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/A/W.No.08/WMM/S-T/2016-17 14.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of Work	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	14.09.2016

Result : Flakiness Index = **11.58%**

Elongation Index = **13.93%**

Result : Combined Flakiness & Elongation index 25.51%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/A/W.No.08/SDBC/AIV/2016-17 24.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of the Work	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.09.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	295	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.96	22.98	22.47

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/A/W.No.08/SDBC/Shape_T/2016-17 : 24.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of Work	: Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 24.09.2016

A&B

Result : Flakiness Index = **12.58%**

Elongation Index = **13.74%**

Result : Combined Flakiness & Elongation index **26.32%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/A/W.No.08/SDBC/Stripping/2016-17 24.09.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of the work	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.09.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

AE-8

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.4	3.27	96.73
2	3.2		
3	3.2		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/A/W.No.08/SDBC/Sp_Wa/2016-17

24.09.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
Name of the Work	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	24.09.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2022	2026	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1267	1271	
4	Weight of saturated surface dry aggregate in air	W_3 g	2017	2012	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	747	745	744	
6	Weight of oven dried aggregate	W_4 g	1999	1995	1996	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.676	2.678	2.683	2.679
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.742	2.740	2.753	2.745
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.90%	0.85%	0.95%	0.90%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/A/W.No.08/SDBC/Bit/2016-17 24.09.2016

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CUSTOMER	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
NAME OF THE WORK	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
SAMPLE I/D	Cross Roads and Drain in Kodigehalli Village in Ward No.08
DATE OF TESTING	24.09.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/A/W.No.08/SDBC/Bit/2016-17 24.09.2016

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Amruthraj,** #715, A Block, 2nd Cross, Sahakaranagara, Bangalore – 92.
NAME OF THE WORK	Improvements to Cross Roads and Drain in Kodigehalli Village in Ward No.08, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/24/2015-16 Dated: 20.04.2015
SAMPLE I/D	Cross Roads and Drain in Kodigehalli Village in Ward No.08
DATE OF TESTING	24.09.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.32	5.54	5.54	94.46	90-100
4.75	262.5	55.26	60.80	39.20	35-51
2.36	55.47	11.68	72.48	27.52	24-39
1.18	32.56	6.85	79.34	20.66	15-30
0.3	36.85	7.76	87.09	12.91	9-19
0.075	28.42	5.98	93.08	6.92	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	34.23	7.22	7.22	92.78	90-100
4.75	254.1	53.61	60.83	39.17	35-51
2.36	56.86	12.00	72.82	27.18	24-39
1.18	34.23	7.22	80.05	19.95	15-30
0.3	36.58	7.72	87.76	12.24	9-19
0.075	34.21	7.22	94.98	5.02	3-8

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory.
- The results indicated above are based on the tests carried out on the samples received in the laboratory.
- Any Query regarding the report must be reported within 30 days from the date of testing.

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